Tuberculosis: What Health Care Workers Need to Know

What is tuberculosis?

Tuberculosis (TB) is an infectious pulmonary disease occurring worldwide. It is caused by slow-growing bacteria called *Mycobacterium tuberculosis.* The disease can take many years to develop and may infect other organs, but typically grows best in the alveoli of the lungs.

What are the symptoms of TB?

Initial infection with TB does not cause any obvious symptoms and is usually not contagious. The bacteria can remain dormant for many years and may not cause disease. This is called the *passive* phase. If the bacteria begin to multiply, the infection can develop into the *active* phase, during which a person may experience the following symptoms: cough, low-grade fevers, weight loss, and night sweats. An abnormal chest radiograph is also typical during the *active* phase.

How is TB transmitted?

When a person with *active* disease coughs or sneezes, the bacteria that cause TB are spread through the air on very small respiratory droplets that can remain airborne for extended periods. The bacteria must be inhaled and pass the natural barriers in the nose and upper lungs in order to reach the alveoli.

How can initial infection be detected?

A simple screening skin test is used to detect infection with TB. This skin test, called Mantoux tuberculin skin test, uses purified protein derivative (PPD), is applied on the forearm, and is evaluated 48 hours later. This test will usually show a positive result (have a significant induration) 2 to 10 weeks after initial infection with TB.

Is there treatment for people who are infected?

Treatment of persons who are in the *passive* phase (infected, but no symptoms) is recommended to minimize the likelihood of their developing *active* disease. The most common therapy offered is isoniazid (INH) for at least 6 months, though other regimens are being considered.

When *active* disease is present there are several drugs available for treatment; isoniazid, pyrazinamide, ethambutol, and rifampin are the first line of drugs recommended. Since resistant mycobacteria can be "selected" when single-drug therapy is used, multi-drug treatment is necessary. It is very important that the mycobacteria isolated from a given person be susceptible to the drugs being administered. This laboratory result may take several weeks to determine. A person should not be considered successfully treated unless his/her clinical condition improves (a decrease in mycobacteria seen on sputa smears, improved chest radiograph, decreased coughing, etc.). Successful treatment requires at least 6 months of therapy. Unfortunately, multi-drug-resistant (MDR) strains may occur in situations in which persons fail to complete the prescribed course of therapy.

How common is TB at the Clinical Center?

Your chance of being exposed to TB in the DC-VA-MD community is much higher than in the Clinical Center (CC). There have been very few patients with *active* TB seen in the CC; in fact, from January 1990 to December 2000, only 10 cases were identified. When patients known to have TB are admitted to protocols in the CC, they are identified and isolated immediately.

What are the risks for acquiring TB infection among health care workers at the CC?

The risk for most workers will be negligible because they do not work with TB patients. Workers in areas where TB patients may be seen are at possible risk of acquiring TB, and should take special precautions to prevent transmission.

For those working with a TB patient, the likelihood of transmission depends upon the patient's level of infectivity, the quality of the room's ventilation, and extent of exposure. The risk of transmission increases if the patient is highly infectious (has a large bacterial load and a productive cough — especially if the mouth is not covered) and/or if the room's ventilation is poor. The risk of transmission increases with the duration of exposure. For example, household contact is more likely to lead to infection than is health-care-related contact.

What precautions should be used with someone who is hospitalized with TB?

At the CC a combination of administrative controls, engineering controls, and personal protective equipment is used to reduce the risk of transmission. Most important is to identify infectious patients and to take the necessary infection-control measures. Physicians are instructed to consider TB high on their list of possible causes of pulmonary disease. A patient with possible TB should be isolated. Clinical flowcharts to guide management are available from

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the Hospital Epidemiology Service. Respiratory isolation is very important for individuals who are newly diagnosed, and for those who have not been successfully treated and are infectious. A private room with negative pressure ventilation is used in most cases. Health care workers should instruct and remind the patient to cover his/her mouth when coughing. If you have contact with a patient with TB, you must wear a CC-approved respiratory protection device (such as a face mask). Before using this mask, you must have medical clearance and mask-fit testing and training. If you have not been trained **and** anticipate caring for a patient with *active* TB, ask your supervisor to arrange training by contacting the Environmental Safety Officer (ESO) at 6-5281.

Visitors are discouraged from entering the patient's room. If the visit is deemed necessary, the visitor must have medical clearance and mask-fit testing and training; contact the patient's nurse to receive training.

Are there any workers who should not care for TB patients?

In general, most workers can provide care to TB patients as long as they follow the recommended infection control precautions. Individuals who are severely immunocompromised may elect not to provide care. Any worker who thinks that he or she should not provide care to TB patients should contact the Occupational Medical Service (OMS) at 6-4411 for a confidential evaluation.

If you believe you may be immunocompromised and you think you might work with TB patients, you should contact OMS at 6-4411 for a confidential evaluation.

Are immunocompromised people at greater risk?

Immunocompromised individuals are not at greater risk of acquiring TB *infection* than are healthy adults, but they may have a greater risk of developing *active disease* once they have acquired TB. Healthy adults have a 10% lifetime risk of developing *active* TB once infected, with the greatest risk in the first two years after infection. For infected immunocompromised individuals, the risk is much higher. For example, once infected with TB, HIV-infected individuals have an 8-10% **yearly** risk of developing *active* disease. HIV-infected patients who have been infected with MDR TB not only have a greater risk of developing *active* disease, but also have a greater risk of dying from TB. In addition, immunosuppressed individuals do not always have a typical presentation of *active* TB which can make *active* disease more difficult to diagnose.

How will health care workers be monitored for infection?

Identifying early infection is very important. Health care workers should have yearly PPD skin testing (every 6 months for certain specified areas), even those who have had past exposure to TB or childhood immunization with Bacille Calmette-Guérin (BCG) vaccine. Initial screening will usually involve a *two-step* process, where a worker will have a second PPD test one week after the first PPD. This procedure is used because infection from the distant past may require two doses of PPD to stimulate the body's dormant TB immune response.

Immunocompromised individuals may be anergic, that is, unable to produce an immune response to the PPD. These individuals may have an anergy panel placed along with their PPD test to assess whether their immune system is functional.

Routine PPD screening will help us improve infection control practices and expedite treatment regimens. OMS provides PPD skin testing for federal employees during walk-in clinics or by scheduled appointment. Call OMS at 6-4411 for walk-in clinic times or to schedule an appointment.

What if a health care worker has a positive skin test?

The first time a worker is tested and found to have a positive PPD skin test, a physical assessment to look for signs of *active* disease will be initiated. This assessment will include a medical history and a chest radiograph. Preventive therapy is recommended for a worker thought to be recently infected (a recent change in PPD status), who does not have *active* disease. Employees enrolled in the TB surveillance program who have a positive PPD are sent an annual reminder of the signs and symptoms of active TB and instructions they should follow should they develop evidence of *active* TB. **Anyone** with a positive PPD who develops symptoms suggestive of TB, or who has been diagnosed with TB, must contact OMS before continuing to work. An evaluation by OMS is essential to prevent possible transmission to co-workers and/or patients.

In conclusion, the Clinical Center has developed an extensive TB control plan. It is vital that all CC workers become familiar with the parts of the plan that affect them. Employees need to understand the principles of TB control to be able to prevent the spread of TB. Contact the Hospital Epidemiology Service at 6–2209 with any questions or concerns or to review the Clinical Center TB Control Plan.

HES revised 5/01